West Nile Virus Response Plan

2009

Public Health
Seattle & King County

Environmental Health Services Division
Zoonotic Disease Program
401 5th Ave Suite 1100
Seattle, WA 98104
206-205-4394

www.kingcounty.gov/health/westnile

Prepared by: Leah Helms, RS - WNV Coordinator
Sharon Hopkins, DVM, MPH - Public Health Veterinarian

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Introduction

West Nile virus (WNV) is a mosquito-borne virus first identified in the West Nile region of Africa in 1937. The virus has caused outbreaks of disease in Africa, Asia, Eastern Europe and the Middle East, however it did not appear in the United States until 1999. After first being discovered in birds and people in the metropolitan New York City area, it spread westward across the US and into Canada and Mexico. Since 1999, there have been over 28,000 cases of illness and 1,124 deaths reported in the US.

WNV was indentified for the first time in King County in October 2006 in six birds and one equine fatality. Also in 2006, the State's first human cases occurred in Pierce County (2 cases) and in Clark County (1 case). In 2008 Washington state reported WNV findings in 41 horses, 57 mosquito pools, 24 birds and 3 humans. This is the largest number of WNV surveillance findings in the state since the first was first detected in 2003 with WNV positive surveillance occurring in both Eastern WA and Western WA. In King County three crows tested positive for WNV with the first positive bird on 9/15/08 and the last positive bird on 10/16/08. This is the earliest positive WNV findings have been detected in King County.

WNV can infect humans, birds, mosquitoes, horses and other animals. Birds are the reservoir host and carry the virus in nature. Mosquitoes become infected after feeding on infected birds. People bitten by a mosquito carrying WNV may have no symptoms at all or they may become ill with symptoms ranging from mild to severe. The less serious form is called West Nile fever, a flu-like illness that may last from a few days to several weeks. In the more severe forms, WNV affects the nervous system causing swelling and inflammation of the brain or covering of the spinal cord (called neuroinvasive disease) and may result in long term disability, paralysis, and death.

Purpose

The purpose of this response plan is to define Public Health– Seattle & King County's role for West Nile virus response in King County. The components of this plan are:

- Response coordination
- Surveillance
- Education
- Control

The King County WNV Phased Response Guidelines is a document which details the timeline for when these activities occur as a phased response throughout the calendar year with the bulk of the response occurring from June through October. A copy of these guidelines are included in Appendix A.

2008 WNV Quick Facts

US
1370 cases
37 fatalities

States Hardest Hit
California 411 cases
Arizona 109 cases
Mississippi 99 cases

Canada
36 cases
0 fatalities

Washington
3 human
24 birds
41 equine
57 mosquito pools

King County
3 birds
0 equine
0 mosquito pools

2007 WNV Quick Facts

US
3576 cases
115 fatalities

States Hardest Hit
Colorado 576 cases
California 379 cases
North Dakota 369 cases

Canada
3359 cases
98 fatalities

Washington
1 bird
1 dog
8 equine
0 mosquito pools
0 human cases

King County
No positives

2009 Program changes

In October 2008 it was announced the King County faced a serious budget shortfall for 2009 and that many areas of county government and services would be impacted. As a result of the reduced budget, Public Health is operating the WNV program in a reduced level for 2009.

In 2009 Public Health will take dead bird reports from citizens, test about 50 - 75 dead birds, provide communication to cities about WNV during the peak season, and distribute educational materials by request only. We will not be conducting mosquito surveillance or testing. Our ability to respond to citizen inquiries about standing water on private property will be very limited. Public outreach will be reduced to mailing supplies of educational brochures when requested and maintaining our WNV website.

We hope that this funding shortfall will be temporary and that we will be able to restore our WNV response program in future years. As a result we have minimally updated our 2009 response plan.

Response Coordination

Public Health – Seattle & King County (Public Health) is the designated lead agency for WNV response in King County. Public Health conducts surveillance for WNV in people, animals, and mosquitoes; provides educational materials and resources; conducts outreach and public education; coordinates mosquito control activities throughout the county; and provides cities and partner agencies with training and technical assistance. Adult mosquito control activities (e.g., spraying) would also be coordinated through Public Health if deemed necessary in the event of a human outbreak as defined in Alert Levels 4 and 5 of the Phased Response Guidelines (Appendix A).

Public Health works closely with King County agencies and local jurisdictions to provide technical assistance and educational materials to meet the needs of their communities. The King County West Nile Virus Interagency Work Group (IAWG) was formed in 2003. This is a group of representatives from local agencies and jurisdictions that meets periodically throughout the year to discuss planning for WNV response and to prepare for the impact that it may have on our communities.

Public Health hosts an annual training for municipalities in the spring each year, and during the summer months there are weekly updates via e-mail and periodic meetings. In addition to the IAWG, Public Health also sends an annual "Letter to the Mayor" to each of the 39 municipalities to encourage support for city-funded mosquito control and public outreach efforts for WNV prevention (Appendix B). County government agencies as well as the Port of Seattle and the University of Washington are also contacted.

Mosquito Surveillance

Objectives

Mosquito surveillance in King County is conducted to: a) monitor mosquito abundance by geographic area and time of the year; b) determine which vector mosquito species are present and where they are found; and c) detect the presence of West Nile virus in vector mosquito species.

Background and Current Activity

The risk of West Nile virus depends on the prevalence of mosquito species that bite both birds and humans, and their proximity to human populations.

In cooperation with the Washington State Department of Health (DOH) and Seattle Public Utilities (SPU), Public Health collects samples of adult and larval mosquitoes throughout the county. In the event of WNV positive mosquito pools, surveillance activities will help to guide education outreach and mosquito control efforts within the county. The level of response is based on the WNV Phased Response Guidelines (Appendix A).

A mosquito (vector) control district is not established in King County. Therefore much is not known about mosquito ecology in King County, a large county with diverse topography and population density (urban population centers, suburban, rural, agricultural and forested regions). There is still much to learn about how WNV will impact the Pacific Northwest; mosquito surveillance is a key function of this process.

Response Plan

- Adult mosquito trapping is done during the peak mosquito season from June until early October. Seasonal temporary staff are hired to perform trapping. The season may be adjusted based on surveillance findings, weather, and other factors.
- Mosquitoes are trapped using EVS traps baited with dry ice at predetermined locations and intervals throughout the county. Seattle Public Utilities traps with the city of Seattle and Public Health in the county.
- Trap sites are selected based on criteria such as known mosquito habitat, mosquito activity complaints, crow roosts, areas with previous WNV positive birds or mosquitoes, and proximity to locations of concern like senior centers, parks, schools or retirement communities.
- In King County mosquitoes tested for WNV are *Culex pipiens,* the northern house mosquito, and *Culex tarsalis,* the western encephalitis mosquito. These are species believed to be the most likely to transmit WNV in our area.
- Trapped mosquitoes are identified as to their species with assistance from WA DOH; vector species are sent to a lab at UC Davis for WNV testing.
- Samples of vector species are tested by pools (groups of ≥ 12 female mosquitoes of same species collected at a single site on one night).
- In the event that pesticides are applied for adult mosquito control, mosquito trapping may be used to evaluate control efficacy.

UPDATE!
In 2009 the WNV program will be operated at a reduced level due to budget constraints. As a result both Public Health and Seattle Public Utilities will suspend mosquito surveillance in 2009.

There is a possibility that the program may be restored in the future therefore we are not altering the response plan at this time.

Results of 2008 Mosquito Surveillance Program

Overall

- 437 mosquito trapping events
- 974 mosquito pools identified
- 205 pools suitable for WNV testing, all negative.

City of Seattle
(Seattle Public Utilities)

- 295 trapping events
- 601 mosquito pools
- 77% of mosquitoes identified were vector species

King County
(Public Health)

- 142 trapping events
- 373 mosquito pools
- 40% of mosquitoes identified were vector species

Dead Bird & Mammal Surveillance

Objective

To detect West Nile virus in birds and mammals in advance of human disease.

Background and Current Activity

Since the discovery of WNV in the US in 1999, surveillance for the virus in dead birds has proven to be the most useful tool for early detection of the presence of WNV in an area and prediction of human disease risk. Testing dead birds is the most sensitive method of environmental surveillance, even more so than testing mosquitoes or flocks of sentinel captive birds such as chickens.

Horses are also quite susceptible to WNV infection and suffer a high rate of death due to the disease. Testing of horses and other equines is usually done by a community veterinarian who is required by law to report infections to the Washington State Department of Agriculture (WSDA) or the local or state health department. An equine vaccine is available and recommended for prevention of WNV in horses. Dogs are also occasionally found to be infected; there was one ill dog with confirmed WNV infection reported in WA State in 2007. Some species of squirrels are also susceptible to WNV and are tested in California as part of their surveillance program.

Response Plan

- Public Health solicits dead bird reports year round from the public via phone at 206-205-4394 or web (http://www.metrokc.gov/health/westnile). Birds are mapped to identify clusters of deaths and suitable samples collected for WNV laboratory testing.
- In 2008 for the first time, Public Health tested birds by collecting an oral swab in place of submitting the entire carcass.
- From early July - Oct, a geographically representative sample of approximately 50-75 birds will be collected for WNV laboratory testing.
- Dead bird reports are screened by Public Health staff as to type of bird and location. Birds eligible for testing must be fresh (dead < 24 hrs) with no signs of trauma.
- Birds of interest for WNV testing in King County are birds in the corvid family, primarily crows, jays, and ravens. Magpies are also tested in eastern Washington but rarely found in western Washington.
- Reports of certain bird species (e.g., water fowl and shorebirds) are shared with the WA State Department of Fish and Wildlife (WDFW) for their avian influenza monitoring program. Reports of dead domestic poultry are shared with WA State Department of Agriculture (WSDA).
- Information on equine or other mammalian cases are shared between public health agencies and WSDA depending on which agency receives the report.

- **2008 Non-human Surveillance in KC**

Dead Birds

- Over 1600 reports of dead birds were received from the public and mapped.
- 71 dead birds were submitted for lab testing; Three tested positive for WNV.

Equines

- No King County horses were tested for WNV.

Birds for WNV Surveillance

Crow

Jay

Raven

Magpie

Human WNV Surveillance

Objectives

Human WNV surveillance in King County is conducted to: a) detect human cases of West Nile virus infection and identify potential exposures to King County residents b) determine local geographic areas where WNV is being transmitted c) monitor WNV case trends over time and compare them to national trends d) provide information for health care professionals regarding diagnosis and testing e) support public education efforts about mosquito habitat control measures and mosquito bite prevention.

Background and Current Activity

As of early 2009, no cases of human WNV illness are known to have been acquired in King County. The first human cases in the state were diagnosed in Western Washington in 2006, with one case in Clark County and two in Pierce County. In 2008 there were three human WNV cases where exposure occurred in Eastern Washington in Yakima and Benton Counties. There was a fourth human case in which the resident had traveled in both Eastern WA and Oregon during the exposure period.

Most people with WNV have mild or no symptoms. About 20% of infected persons develop the less serious form of the disease called West Nile Fever. One in 150 infections results in the more severe neuroinvasive form that affects the brain and nervous system. Approximately 3-15% of patients hospitalized with West Nile neuroinvasive disease die from it. The risk of serious disease and death is highest in elderly patients. Persons with diabetes are also at increased risk. There is no specific treatment other than supportive care for WNV disease. Because no human vaccine for WNV is available, public education and community outreach efforts about mosquito habitat control and the importance of avoiding mosquito bites are the essential components of prevention. More information on how to prevent WNV infection is available at the Public Health web site at http://www.metrokc.gov/health/westnile/.

Preventing Human WNV Infection

There is no human vaccine for WNV infection.

Ways to prevent WNV infection include reducing mosquito habitats, using personal protection (such as long sleeves, long pants, and mosquito repellant), staying inside when mosquitoes are active, and installing window and door screens.

Use mosquito repellents that contain DEET or Picaridin. Oil of lemon eucalyptus provides protection similar to low concentrations of DEET.

Response in the Event of Human WNV Cases

As of February 2009, there have been no cases of locally-acquired human cases in King County.

In the event of locally-acquired human cases, surveillance, educational and control efforts will be increased in accordance with the WNV Phased Response Guidelines.

Human WNV Surveillance

Response Plan

Health care providers, hospitals and laboratories are required to report suspected or confirmed cases of WNV to their local health department (in King County, call 206-296-4774). Public Health investigates cases to determine if they meet the WNV case definition, how they were exposed, if exposure occurred in King County, and if there is a potential risk to others from blood, tissue or organ donations.

Public Health—Seattle & King County facilitates testing at the WA Public Health Laboratory for patients with suspected WNV neuroinvasive disease; for pregnant or breastfeeding women with symptoms of suspected WNV infection and their newborns or breastfeeding infants; and for recent blood, tissue, or organ donors or recipients suspected to have WNV infection. For patients who do not meet the above lab testing criteria, testing is available at commercial laboratories or the Public Health—Seattle & King County Laboratory on a fee-for-service basis.

All probable and confirmed case reports are forwarded to the Washington State Department of Health, which reports cases to CDC via ArboNET. CDC publishes updated national case maps weekly on their WNV web site at http://www.cdc.gov/ncidod/dvbid/westnile/index.htm.

More detailed information for health care providers about human WNV disease, laboratory testing, diagnosis and reporting is available on the Public Health website at http:www.metrokc.gov/health/providers/wnv-clinicians.htm.

Public Education

Objective

To educate the higher risk groups and the general public on the most effective ways to reduce the risk of WNV infection including mosquito habitat reduction, personal protection, and property preparation.

Background and Current Activity

Education is a key prevention strategy and an important role of Public Health and other government agencies. Public Health has developed and distributes educational materials, and asks that cities and partner agencies assist in providing this information to their constituents. Prevention messages are: reducing mosquito populations by getting rid of sources of standing water where mosquitoes lay their eggs and personal protection against mosquito bites. Public Health also has the capacity to open and staff a Public Information Call Center (PICC) in the event of a WNV outbreak or other high demand for public information.

Community outreach is a main component of the Public Health education strategy, especially for those at high risk for WNV infection or more severe forms of the infection. High-risk populations include the elderly, persons living or working outdoors, people who spend time outdoors at dawn or dusk, and unsheltered homeless persons. The need to make efforts to reach ethnic communities with low-English proficiency who may not be reached by mainstream media and English-language educational materials has also been recognized.

As part of our outreach plan, at-risk populations have been identified and a distribution plan has been developed to reach out to these communities. Letters and order forms for educational materials are distributed to agencies and community organizations serving at risk populations. Cities and agencies have been contacted each year, provided materials, and asked to distribute information to their communities and to employees.

Public Health responds to emails and phone calls from the public, gives advice, and sends materials. Public Health staff provides materials, outreach visits, and presentations to community groups when requested and provides in-services to city and agency staff, especially utility workers.

Downloadable brochures in 7 languages, fact sheets, streaming video, and other educational materials are available on the Public Health website at www.metrokc.gov/health/westnile. New educational materials for 2008 with the “Fight the Bite” or “Combata la Picadura” logo (see sidebar) include post cards, bookmarks, wallet cards, and door hangers.

Public Education

Response Plan

- By mid-May, mail letters and material order forms to community groups and agencies identified for outreach.
- In mid-June, make press release to announce beginning of WNV season, remind public of mosquito habitat reduction and personal protection measures, and the upcoming start of environmental surveillance (mosquito and bird testing). Remind citizens to report dead birds.
- Present educational displays and distribute mosquito repellent samples at community events, health fairs, and at the King County fair in Enumclaw.
- Beginning in June, maintain educational displays and sell low-cost repellent at Public Health clinic sites.
- Distribute wallet cards and bookmarks with the "Fight the Bite" logo to cities and agencies for distribution.
- Distribute free mosquito repellent as available to Health Care for the Homeless program.
- Update website information continually during the WNV season and post maps of dead bird reports, mosquito surveillance results and other surveillance data.
- Participate in press releases and media events as appropriate during the WNV season.
- Maintain readiness and staff training for a Public Information Call Center (PICC), if needed.

UPDATE!
In 2009 the WNV program will be operated at a reduced level due to budget constraints. Public outreach will be limited to maintaining the website and distribution of educational materials by request only.

There is a possibility that the program may be restored in the future therefore we are not altering the response plan at this time.

WNV educational brochures are available in the following languages:

- English
- Spanish
- Chinese
- Cambodian
- Vietnamese
- Korean
- Russian

For downloadable files, see:
http://www.metrokc.gov/health/westnile/

Mosquito Control: Habitat Reduction & Prevention of Mosquito Development

Objective

To prevent the spread of West Nile virus by reducing habitat and controlling mosquitoes at the larval stage of development using the principles of Integrated Pest Management.

Background and Current Activity

There is no mosquito or vector control district in King County nor are there ordinances specifically dealing with mosquito abatement or prohibiting standing water that forms mosquito habitat on private property. Some enforcement of mosquito habitat minimization may be possible through solid waste code (i.e. where solid waste, such as tire piles, is the primary violation and mosquito habitat is also present).

Public Health provides mosquito control recommendations to private property owners and training/technical assistance to public agencies in King County. In response to the threat of WNV and with the encouragement of Public Health, many agencies and jurisdictions have chosen to proactively provide mosquito control on their own properties. This may include reducing sources of standing water and treating mosquito-producing stormwater ponds and catch basins with larvacides.

Response Plan

- Public Health does not directly conduct mosquito control activities, except on its own properties in conjunction with King County Facilities.
- Public Health strongly recommends that owners of residential, commercial, and municipal properties inventory their properties for sources of mosquito larval habitat and conduct control activities using integrated pest management principles (see sidebar).
- To prevent standing water, federal, state and local governments should maintain existing drainage and water holding structures on their properties such as sumps, recharge basins, sewage or wastewater treatment facilities, street catch basins, salt marsh ditches, upland streams, ponds, and pools (unless law dictates otherwise). Engineering strategies and IPM should be implemented to eliminate breeding sites.
- Privately owned or operated sewer facilities should be maintained in a similar fashion to eliminate larval mosquito habitat.
- Municipalities should disseminate mosquito control information and provide assistance to residents when possible, coordinate mosquito control activities on public property, and work with county and state agencies on behalf of the residents in their jurisdiction.
- Municipalities and county agencies should report mosquito surveillance data and larvacide applications to Public Health.
- As WNV threat increases, mosquito control activities should be intensified according to the WNV Phased Response Guidelines.
- Regulations relevant to mosquito control and the powers of local directors of health can be found in Appendix F.

UPDATE!
In 2009 the WNV program will be operated at a reduced level due to budget constraints. Public Health will be directing citizen complaints to the website or mailing information.

There is a possibility that the program may be restored in the future therefore we are not altering the response plan at this time.

Principles of Integrated Pest Management (IPM)

Integrated Pest Management is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, and with the lest possible hazard to people, property and the environment.

- **IPM for Mosquito Control**
  - Conduct on-going monitoring of mosquito habitat for larvae
  - Eliminate sources of standing water that are not naturally occurring (e.g., empty buckets, drain gutters and water on flat roofs, eliminate puddles, tire piles)
  - Maintain natural mosquito predators such as fish, frogs and dragonflies in wetlands and ponds
  - Apply targeted applications of larvicide products, with proper permits and controls to inhibit the development of mosquito larvae into adults

Adult Mosquito Control

Objective

To control adult mosquito populations to prevent the spread of WNV in the event of a human outbreak.

Background and Current Activity

Adult mosquito control (known as adulticiding) may be considered in the event of human cases or a high risk of human cases and conditions favoring continued transmission to people (e.g. persistent high infection rates in mosquitoes, continued avian mortality due to WNV). In other jurisdictions, adulticiding has been performed using backpack or truck-mounted sprayers or aerial applications with fixed-wing aircraft or helicopters.

Public Health will be the lead agency for emergency adult mosquito control should this become necessary. Spraying would be done in coordination with affected municipalities or jurisdictions. Public Health, with guidance from the Department of Natural Resources and Parks (DNRP) will coordinate contracting with a suitable company to provide the services requested and follow best management practices (BMP) for adulticiding drafted by DNRP. Public Health will follow procedures required by Washington State Department of Ecology (DOE), WA State Department of Agriculture (WSDA) and WA Department of Health (DOH). There is the potential for reimbursement should the State make funds available for emergency mosquito control.

Response Plan

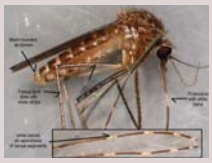
When conditions favor a high risk of human outbreak (Alert Level 4) or a human outbreak is in progress (Alert Level 5), mosquito control response may support spraying for adult mosquitoes. These actions include:

- Intense larval control and habitat reduction will continue.
- With direction and technical support from Public Health, adult mosquito spraying program may be implemented in high risk areas.
- Adult mosquito spraying may be intensified to include repeat spray applications until surveillance indicates reduced infection levels in mosquito populations.
- If an outbreak is widespread and covers multiple jurisdictions, Public Health will coordinate spraying and control activities with neighboring counties and through the DOH.

See the WNV Phased Response Guidelines in Appendix A for details.

Culex tarsalis

Western Encephalitis Mosquito



Culex tarsalis, is a mosquito species capable of transmitting WNV and is thought to be a prime vector in many areas. It is found more often in rural King County compared to urban areas.

Culex tarsalis larvae develop in permanent and semi--permanent waters such as log ponds, stormwater ponds, ditches, irrigation systems, marshes and pools in grasslands and woodlands. Larvae may also be found in artificial containers.

ponds. ***Culex pipiens***

Northern House Mosquito

Culex pipiens is a very common mosquito species in this area and it is capable of transmitting WNV. In King County, its preferred habitat seems to be urban areas where it lays its eggs in standing water in catch basins, all types of containers, puddles, standing water on roofs and in gutters, abandoned swimming pools, and unmaintained

Appendix A
West Nile Virus Phased Response Guidelines for Cities & Agencies in King County

Public Health—Seattle & King County
Contact: Dr. Sharon Hopkins, WNV program lead, (206) 263-8454 or Sharon.Hopkins@kingcounty.gov

Guidelines for a Phased Response to West Nile Virus Using Surveillance Data

The phased response plan uses a range of surveillance data and the timing of the surveillance findings to guide community response to the threat of West Nile virus (WNV). The principal goal is to minimize the health impact of WNV in our residents, as well as in domestic and zoo animals and in wildlife. We have a limited (but increasing) understanding of the ecology and epidemiology of arboviruses such as the West Nile virus in the US, so it is important to realize that predicting the arrival and intensity of WNV activity in any given area is difficult. It is also important to note that, while prevention and control measures will aid in mitigating the effects of WNV in a community, it is unlikely that human infections can be entirely prevented.

Surveillance for WNV in dead birds (especially in crows, jays, and raptors) can be expected to provide the earliest warning of the arrival of West Nile virus each season, therefore, residents and city governments are asked to assist Public Health in its dead bird reporting and testing program. Surveillance for mosquito larva is another critical component which is used to guide cost-effective mosquito control efforts; city governments are asked to monitor for mosquito larva in city-owned properties and report results to Public Health. Public Health also has programs for surveillance of WNV in captured adult mosquitoes ("mosquito pool testing"), monitoring of WNV testing performed by local blood centers, and for collecting reports of equine and human cases of WNV.

Cities should also be aware that new mosquito habitat is being created continually by housing developments, public and private construction projects, flooding, and land use changes. Periodic assessments should be undertaken to identify new mosquito habitat and implement surveillance if necessary.

Public Health staff are responsible for compiling, mapping, and monitoring the range of WNV surveillance data (e.g., bird, mosquito, equine, and human cases) and determining the WNV Alert Level that guides the phased response. Public Health will keep municipalities and partner agencies appraised of the current WNV Alert Level through e-mails to the WNV Interagency Work Group and on the WNV website at http://www.metrokc.gov/health/westnile.

City officials are encouraged to consult with Public Health—Seattle & King County on interpretation and application of these phased response guidelines. We also encourage cities to join the Public Health-sponsored WNV Interagency Work Group which meets periodically from spring through fall and which keeps members informed of surveillance findings, recommendations, and educational resources through regular e-mail communications.

Dr. Sharon Hopkins of the Environmental Health Services Division is Public Health's lead for the WNV Program and is available for questions and technical assistance. She can be contacted by e-mail (Sharon.Hopkins@kingcounty.gov) or telephone (206-263-8454). Leah Helms is the WNV Program Coordinator and can be reached at 206-263-8450 or Leah.Helms@kingcounty.gov. The mailing address is 401 Fifth Avenue, Suite 1100, Seattle, WA 98104. The FAX number is 206-296-0189.

We also encourage city officials to review the many WNV resources available at our web site at http://www.metrokc.gov/health/westnile/ .

West Nile Virus (WNV) Phased Response Guidelines for Cities & Agencies in King County

Alert Level	Definition	Surveillance Response	Education Response	Control Response
0	**Winter (off season)** No mosquito activity; approx Nov – Mar In King County ***No risk of human WNV outbreak***	- Analyze surveillance findings from previous season - Review and update mosquito and bird surveillance plans for coming season and secure materials, funding and other resources	- Evaluate effectiveness of educational materials and outreach from previous season and update plans for coming season - Restock brochures and other educational materials; check with Public Health for availability of new materials	- Evaluate mosquito surveillance and larvaciding activities from previous year; update WNV Response plan - Develop control plans including capacity to respond in the event a major WNV outbreak in the coming season requires extensive larval control efforts or adult mosquito spraying - Prepare for larvaciding of city properties by obtaining NPDES permit through WA DOH -Have designated staff obtain Pest Control Operator licensing, or contract with private pest control company to provide surveillance and larvaciding services during mosquito season
1	**Spring, summer & fall** No positive surveillance findings in King County in the current calendar year (e.g., no WNV positive birds or mosquito pools and no WNV cases in humans or horses) ***Remote risk of human outbreak***	- Inventory & map mosquito habitat - Conduct mosquito surveillance at city properties by larval dipping and periodically report results to Public Health - Field employees such as Parks or Utilities crews should report dead bird sightings and monitor mosquito habitat - Encourage citizen reports of dead birds or significant mosquito problems to Public Health - With assistance of Public Health, determine associations between known mosquito vectors and habitat type	- Inform city staff of recommended personal protection measures against mosquito bites via Human Resources, city intranet sites, and staff meetings; consider providing mosquito repellent products to field staff - Keep city Public Information Officer informed of WNV status and key public messages consistent with local and state recommendations - Provide public education and outreach on WNV prevention emphasizing mosquito habitat reduction and personal protection against mosquito bites ***Examples of public outreach include:*** Establish or maintain WNV information on city web site with links to Public Health WNV pages at www.metrokc.gov/health/westnile Encourage citizens to report dead bird sightings & mosquito activity Insert WNV prevention messages/ brochures in utility statements, city newsletters, etc Make WNV educational materials available at community & senior centers, parks, sports fields, festivals, and other community events and gathering places	- Initiate source reduction of mosquito habitat at city-owned properties using principles of integrated pest management - Encourage source reduction by homeowners, businesses, and housing developments - Respond to mosquito complaints from citizens - Consider use of larvacides at city facilities, water features and drainage systems identified as having potential mosquito vector species and where larval counts meet or exceed 1 larva per 3 dips (or average of 0.3 larva per dip) At Alert Level 1, larvaciding may be limited to sources in proximity to vulnerable populations such as senior housing, densities of population > 50 yrs of age, and outdoor venues used at dusk and evening hours - Review plans for control response to higher Alert Levels -Obtain supplies of larvacide, or have a plan for obtaining sufficient larvacide rapidly if needed - Attend WNV trainings sponsored by Public Health or other organizations

West Nile Virus (WNV) Phased Response Guidelines for Cities & Agencies in King County

Alert Level	Definition	Surveillance Response	Education Response	Control Response
2	**Summer or fall** Areas with limited or sporadic WNV activity in wild birds and/or mosquito pools starting **after August 1** *(See Alert level 3 if positive birds or mosquitoes occur **before August 1** or if there are human or equine cases)* ***Low risk of human outbreak***	- Continue activities of Alert Level 1 - Conduct intensified surveillance in areas of positive findings to identify possible sources & mosquito species - Expand surveillance in areas adjacent to those with positive WNV surveillance findings - Assist Public Health in conducting live mosquito trapping and intensified larval surveillance in areas with WNV positive birds or mosquitoes - Monitor maps produced by Public Health indicating areas of WNV activity	- Continue activities described in Alert Level 1 - Update city web site emphasizing presence of WNV in the area and prevention measures - Increase public education emphasizing personal protection, particularly for persons over 50 - Provide personal protection information (and mosquito repellent products if feasible) to homeless persons - Prepare or update news articles for use by senior-oriented newsletters or other publications and encourage public education via local or regional newspapers with attention to non-English-speaking residents (materials are available from Public Health) - Send Public Health's "Mosquito Control Fact Sheet for Private Property Owners" to persons or organizations known to have potential mosquito breeding habitat, facilities, water features, and drainage systems	- Continue control activities in Alert Level 1 - Monitor street drains/catch basin in proximity to vulnerable populations for mosquito production and apply larvacides if indicated - Intensify mosquito habitat/source reduction and larval control at facilities, water features, and drainage systems in proximity to areas with positive WNV surveillance findings -Provide information and/or support for appropriate control responses by private agencies, businesses, and organizations in the city with mosquito habitat and/or facilities, water features and drainage systems under their authority - Review or develop plans for adult mosquito control should it be determined, in consultation with Public Health, that this control step is necessary in limited locales
3	**Spring, summer or fall** Initial confirmation of a WNV positive bird or mosquito pool collected **before August 1** **OR** a confirmed equine or human case (even if no positive birds or mosquito pools have been detected) **OR sustained high levels of** WNV activity in birds or mosquito pools in the absence of equine or human cases ***Moderate risk of human outbreak***	- Continue with surveillance activities described in Alert Level 2	- Continue efforts described in Alert Level 2 - Keep city Public Information Officer informed and ready to disseminate the public information that will be needed if adult mosquito spraying is undertaken - Expand public information to include TV, radio and frequent newspaper reports emphasizing personal protection, particularly for persons over 50, as resources allow - Mobilize community group efforts for mosquito source reduction such as neighborhood clean up days; provide prevention information at community festivals, health fairs and outdoor events - Encourage citizens and community partners to actively assist elderly or disabled residents with source reduction, screening windows, screen repairs, and use of mosquito repellents and other protection	- Intensity habitat reduction and larval control at facilities, water features and drainage systems throughout the city Larvaciding of street drains/catch basins in proximity to vulnerable populations may be necessary at this alert level, based on the experience of other US cities in past years - Intensify efforts to encourage and coordinate appropriate control responses by private agencies, businesses, and organizations with mosquito habitat, facilities, water features and drainage systems under their authority - With direction and technical support from Public Health, be prepared to respond if Public Health determines specific areas of high human risk and the need for limited, targeted adult mosquito spraying within your jurisdiction An example is spraying of a park the day before an evening public event such as a outdoor concert - Review criteria and plans for more wide-spread adult mosquito spraying efforts should the Alert Level increase to Level 4

West Nile Virus (WNV) Phased Response Guidelines for Cities & Agencies in King County

Alert Level	Definition	Surveillance Response	Education Response	Control Response
4	**Spring, summer or fall** Surveillance indicates a high risk of human infections, as shown by indicators such as: a) high dead bird densities starting in early summer; b) sustained high mosquito infection rates; c) multiple positive mosquito species; d) equine or mammal cases indicating escalating epizootic, e) a human case with high levels of bird, mosquito or equine infections; f) areas with early WNV activity that experienced epidemic conditions in past years ***High risk of human outbreak***	- Continue with surveillance activities described in Alert Level 3 with emphasis on determining areas with significant populations of adult mosquitoes of vector species	- Intensify efforts described in previous alert levels - Engage local community leaders and government officials to speak about WNV - Enhance risk communications to public and owners of private facilities, water features and drainage systems about adult mosquito spraying	- Continue intense larval control and habitat reduction - With direction and technical support from Public Health, initiate on-going adult mosquito spraying program in high risk areas - In conjunction with state agencies or Public Health, monitor effectiveness of spraying on target mosquito populations when adult spraying is done
5	**Spring, summer or fall** Multiple confirmed human cases; conditions favoring continued transmission to people (e.g., persistent high infection rates in mosquitoes, con-tinued avian mortality due to WNV) ***Human outbreak in progress***	- Conduct surveillance to monitor effectiveness of mosquito spraying through trap counts and infection rates of vector mosquito species	- Intensify public risk communication about adult mosquito control - Consider distribution of mosquito repellent products at public events, especially those held in the evening - Emphasize urgency of personal protection against mosquito bites through community leaders and the media; emphasize use of repellents at visible public events - Conduct active educational outreach and distribution of repellents in homeless, low-income and non-English speaking communities - Consider distribution of door knob hangers in communities with high number of human cases	- Intensify adult mosquito spraying, repeating spray applications until surveillance indicates adequate mosquito control - If outbreak is widespread and covers multiple jurisdictions, coordinate spraying and control activities with neighboring counties and through the WA Dept of Health

Office of the Director
401 Fifth Avenue, Suite 1300
Seattle, WA 98104-1818
206-296-4600 Fax 206-296-0166
TTY Relay: 711
www.kingcounty.gov/health

Public Health
Seattle & King County

May 29, 2009

The Honorable David Hill
Mayor, City of Algona
402 Warde Street
Algona, WA 98001

Dear Mayor Hill,

We are writing to let you know that our West Nile virus (WNV) program for this year is being reduced, compared to the past several years, due to reductions in funding for Public Health. West Nile virus is spread by infected mosquitoes, and can cause serious and even fatal disease, although many people may not experience symptoms or only a mild illness. As we head into warmer months, WNV becomes a more active concern.

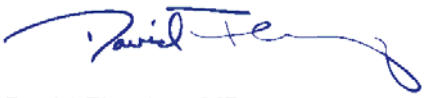
Some laboratory testing of dead birds for WNV will be available through support from the federal Centers for Disease Control and Prevention (CDC), but testing will start later in the summer with fewer birds tested. We continue to take dead bird reports from the public and partner agencies and watch WNV activity elsewhere in Washington and in neighboring states and provinces. Our Communicable Disease/Epidemiology staff receive reports of human WNV disease and follow up on these cases. In the event of a WNV outbreak, we anticipate mobilizing staff to respond to such a circumstance.

Due to our reduced resources, we are ceasing mosquito testing and can no longer respond to complaints about standing water and abandoned swimming pools on private property, other than to direct inquiries to our WNV website or print materials. This may mean that your city will receive more citizen complaints than in past years. We are sending periodic e-newsletters to the WNV Interagency Workgroup, but are not holding our usual spring training or summer meetings. We still have materials that can be distributed by cities and community groups. An order form is available on our website at http://www.kingcounty.gov/healthservices/health/ehs/westnile/education.aspx. Please contact us for WNV brochures and flyers as you prepare for the summer.

The increasing presence of West Nile virus over the past four years strongly indicates that the virus is now endemic to many areas of Washington, including the Puget Sound area. Under favorable climate conditions, such as a wet spring followed by a warm dry summer, proliferation of mosquito vector species and amplification of West Nile virus in birds and mosquitoes can reach critical levels that risk transmission to people. It is anticipated that viral activity will intensify and expand into new areas which could result in increasing numbers of human infections. Surveillance for West Nile virus remains a fundamental tool for preventing and controlling the disease, and it is unfortunate that current budget challenges prevent Public Health from maintaining previous surveillance levels.

It is our hope that Public Health can reconstitute a more robust WNV program in future years. We encourage municipalities to continue to perform mosquito surveillance on city properties and conduct mosquito abatement as your budget allows. If you have any questions, please contact Dr. Sharon Hopkins, Public Health Veterinarian, at sharon.hopkins@kingcounty.gov or at 206-263-8454.

Sincerely,



David Fleming, MD
Director and Health Officer

cc: Sharon Hopkins, DVM, MPH, Public Health Veterinarian, Environmental Health Services, Public Health-Seattle & King County (PHSKC)
Leah Helms, RS, WNV Coordinator, Environmental Health Services, PHSKC

Public Health
Seattle & King County

FACT SHEET

West Nile Virus

❑ WHAT IS IT?

West Nile virus (WNV) causes West Nile fever and West Nile meningitis, encephalitis and West Nile poliomyelitis. It can infect people, birds, mosquitoes, horses and other animals. In Washington State the virus was first found in horses and birds in 2002. The first human infection by WNV in Washington State occurred in 2006.

❑ SYMPTOMS

Most people who are infected with the West Nile virus will not get sick. In those who do become ill, symptoms usually begin between 3 and 14 days after being bitten by an infected mosquito.

About 1 in 5 infected persons will develop West Nile fever, a flu-like illness lasting a few days to several weeks. In addition to fever, symptoms include:

- ✓ Fatigue
- ✓ Headache
- ✓ Loss of appetite
- ✓ Muscle aches
- ✓ Nausea
- ✓ Rash
- ✓ Vomiting
- ✓ Swollen glands

About 1 in 150 infected people will have one of the more severe and potentially fatal forms of disease (West Nile meningitis, encephalitis or West Nile poliomyelitis) that can include symptoms of West Nile fever and:

- ✓ Severe headache
- ✓ Neck stiffness
- ✓ Decreased level of alertness
- ✓ Muscle weakness, tremors, or paralysis
- ✓ Sensitivity to light
- ✓ Convulsions or coma

❑ HOW IS IT SPREAD?

West Nile virus is spread to people mainly by the bite of an infected mosquito. Mosquitoes become infected after feeding on birds that carry the virus. WNV is not spread by direct contact with infected animals or people, but care should always be used when handling sick or dead animals. WNV may be spread via blood transfusion and organ transplantation. Blood and organ donations are routinely tested and infected donations are not used.

❑ WHO IS AT RISK?

The risk of getting West Nile virus is very low, but anyone who is bitten by infected mosquitoes can be infected. Older people over 50 years of age have a higher risk of having more serious symptoms.

❑ DIAGNOSIS AND TREATMENT

- ✓ West Nile virus in humans is diagnosed by testing blood and/or CSF (cerebrospinal fluid from a spinal tap).
- ✓ Contact your healthcare professional if you have symptoms of a possible WNV infection, especially if you recently had mosquito bites.
- ✓ There is no vaccine for humans or specific treatment other than supportive care.

❑ PREVENTION

- ✓ Empty anything outdoors that holds standing water —any standing water can serve as a mosquito breeding site.
- ✓ Change water in birdbaths, fountains, wading pools and animal troughs weekly.
- ✓ Make sure that roof gutters drain properly.
- ✓ Fix leaky outdoor faucets and sprinklers.
- ✓ Make sure that windows and door screens are "bug tight"—if not, repair or replace them.
- ✓ Stay indoors at dawn and dusk when mosquitoes are the most active.
- ✓ Wear protective clothing (long sleeves, long pants and a hat) when going into mosquito-infested areas.
- ✓ Use mosquito repellant when necessary, and carefully follow the directions on the label. Effective repellents contain DEET, picaridin, or oil of lemon eucalyptus.
- ✓ Assist elderly neighbors and relatives in these tasks to help keep them safe from mosquito bites.

❑ WHAT SHOULD I DO IF I FIND A DEAD BIRD?

West Nile virus infects many wild birds including crows, jays and ravens. Increasing numbers of dead birds can be a sign that WNV is present in a community. As with any dead animal, avoid any direct contact. Wear gloves or use a shovel to move the bird. Dead birds can be disposed of by putting them in a plastic bag and then into the garbage.

Public Health tracks and sometimes tests dead birds. You can help by reporting dead birds to Public Health at (206) 205-4394, or on the web at:
www.metrokc.gov/health/westnile/deadbird.htm

Report all King County cases to Public Health by calling (206) 296-4774.

Available in alternate formats.

Communicable Disease Epidemiology and Immunization Section
401 Fifth Avenue, Suite 900 • Seattle, WA 98104-2333
(206) 296-4774 Fax (206) 296-4803 TTY Relay: 711• www.kingcounty.gov/health

Rev 10/23/06 Ref 03/08

Appendix D
2009 West Nile Virus Contacts & Resources

24 hr. Recorded WNV Hotlines

Public Health – Seattle & King County	
Environmental Health	(206) 205-3883
Communicable Disease & Epidemiology	(206) 296-4949 (select option 2)
Washington State Department of Health	1-866-788-4787

WNV Information & Reporting--Public Health

General WNV Questions	(206) 205-4394
Dead Bird Reports	(206) 205-4394
Online dead bird reporting	www.kingcounty.gov/health/westnile/deadbird.htm
Mosquito Problems	(206) 205-4394
Veterinary Cases	(206) 263-8450
Human Cases	(206) 296-4774

WNV Websites

Public Health – Seattle & King County	www.kingcounty.gov/health/westnile/
Washington State Dept. of Health	www.doh.wa.gov/ehp/ts/Zoo/WNV/WNV.html
Permit for Aquatic Mosquito Control	www.doh.wa.gov/ehp/ts/Zoo/WNV/Permit.html
Centers for Disease Control (CDC)	
Main WNV page	www.cdc.gov/ncidod/dvbid/westnile/index.htm
Statistics & Surveillance	www.cdc.gov/ncidod/dvbid/westnile/surv&control.htm
Insect Repellent Info	www.cdc.gov/ncidod/dvbid/westnile/qa/insect_repellent.htm
	www.cdc.gov/ncidod/dvbid/westnile/RepellentUpdates.htm
WSU Cooperative Extension	www.wnv.wsu.edu

Public Health – Seattle & King County Staff

Dr. Sharon Hopkins, Public Health Veterinarian, WNV lead	(206) 263-8454
Sharon.Hopkins@kingcounty.gov	
Leah Helms, WNV Coordinator	(206) 263-8450
Leah.Helms@kingcounty.gov	
Hilary Karasz, Media Officer	(206) 263-8705
Hilary.Karasz@kingcounty.gov	
Human Health Questions	(206) 296-4774
Communicable Disease/Epidemiology Section	

Washington State Department of Health

Elizabeth Dykstra PhD, Medical & Veterinary Entomologist	(360) 236-3388
Jo Marie Brauner, WNV Mosquito & Dead Bird Surveillance	(360) 236-3064
Ron Wohrle DVM, WNV Equine Surveillance	(360) 236-3369
Cyndi Free, Publications & Fact Sheets	(360) 236-3384

Appendix E
King County West Nile Virus Agency Contacts

Public Health Contacts

WNV Program Lead
Sharon Hopkins DVM, MPH
Public Health Seattle & King County
401 5th Ave, Suite 1100
Seattle WA 98104
Sharon.hopkins@kingcounty.gov
Office: (206) 263-8454
Fax: (206) 296-0189

Public Information Officer
Hilary Karasz, (206) 263-8705

WNV Coordinator
Leah Helms, (206) 263-8450

Environmental Health's Emergency Preparedness Liaison
Jim Henriksen, (206) 263-8430

Other King County Divisional & Departmental WNV Contacts

Department of Natural Resources and Parks (DNRP)		
Parks & Recreation	Dave Sizemore	(206) 205-7549
Solid Waste Division	Terri Packard	(206) 296-8475
Water and Land Resources Division (Storm Water Services Section)	Dan Willott	(206) 296-8173
Waste Water Treatment Division	Allen Alston	(206) 684-1156
Department of Executive Services		
Facilities Management Division	Robin Bishop	(206) 296-0674
Department of Transportation (DOT)		
Road Services Division	Sue Walsh	(206) 205-7109
Transit Division	Cathy Johnson	(206) 684-2266
Fleets	TBD	TBD
Department of Development and Environmental Services (DDES)	TBD	TBD
King County Housing Authority	TBD	TBD

Appendix F
Laws and Regulations

Ordinances governing Mosquito Control in Washington State
RCW 17.21 Washington Pesticide Application Act
http://apps.leg.wa.gov/RCW/default.aspx?cite=17.21&full=true

RCW 15.58 Washington Pesticide Control Act
http://apps.leg.wa.gov/RCW/default.aspx?cite=15.58

WAC 16-228 General Pesticide Rules
http://search.leg.wa.gov/pub/textsearch/ViewRoot.asp?Action=Html&Item=1&X=301132055&p=1

RCW 43.05 Technical Assistance Programs

Municipal Research and Services Center of Washington lays out how to form a mosquito control district.
http://apps.leg.wa.gov/RCW/default.aspx?cite=43.05Formation of Mosquito Control Districts, Municipal Research and Services Center of Washington